CLAIMS

1. A fuel cell comprising:

at least one fuel cell element, comprising a solid electrolyte layer of oxygen ion conduction type which is interposed between a cathode layer and an anode layer;

means for supplying a mixed fuel gas of fuel gas, such as methane or others, and oxygen, to which both the cathode layer and the anode layer are exposed to cause an oxidation-reduction reaction between the fuel gas and the oxygen by means of the cell element to generate an electromotive force;

the anode layer being mainly composed of a metal which is oxidation-resistant against the mixed fuel at an operating temperature of the fuel cell element, or a ceramic having electro-conductivity; and

the anode layer being further blended with a metal, or an oxide thereof, selected from a group of rhodium, platinum, ruthenium, palladium, and iridium.

2. A fuel cell as set forth in claim 1, wherein the anode layer is formed of fired material mainly composed of NiO in which Li is dissolved to form a solid solution.

3. A fuel cell as set forth in claim 2, wherein the fired material is obtained by adding an Li-compound to Ni-oxide, which is then subjected to firing treatment.

4. A fuel cell as set forth in claim 2, wherein the fired material is a fired body obtained by firing Ni oxide to which an Li-compound is added in a range from 1 to 15 mol% calculated in terms of Li_2O.

5. A fuel cell as set forth in claim 1, wherein the metal which is oxidation-resistant against the mixed fuel is silver.

6. A fuel cell as set forth in claim 1, wherein the metal, or an oxide thereof, selected from a group of rhodium, platinum, ruthenium, palladium, and iridium, is blended in the anode layer in a range from 1 to 50 vol%

calculated in terms of metal.

7. A fuel cell as set forth in claim 1, wherein the anode layer contains, as an auxiliary component, one of samaria-doped ceria, scandia-stabilized zirconia, and yttria-stabilized zirconia at 50 vol% or less.

8. A fuel cell comprising:

a container having at least one feed port and at least one exhaust port;

a stack of fuel cell elements contained in the container, each of the elements comprising a solid electrolyte layer of oxygen ion conduction type interposed between a cathode layer and an anode layer;

means for supplying a mixed fuel gas of fuel gas, such as methane or others, and oxygen, through the feed port, so that both the cathode layer and the anode layer are exposed to cause an oxidation-reduction reaction between the fuel gas and the oxygen by means of the cell element to generate an electromotive force and for discharging an exhaust gas through the exhaust port;

the anode layer being mainly composed of a metal which is oxidation-resistant against the mixed fuel at the operating temperature of the fuel cell element, or a ceramic having electro-conductivity; and

the anode layer being further blended with a metal, or an oxide thereof, selected from a group of rhodium, platinum, ruthenium, palladium, and iridium.

9. A fuel cell as set forth in claim 8, wherein the anode layer is formed of fired material mainly composed of NiO in which Li is dissolved to form a solid solution.

10. A fuel cell as set forth in claim 9, wherein the fired material is obtained by adding an Li-compound to Ni-oxide, which is then subjected to firing treatment.

11. A fuel cell as set forth in claim 9, wherein the fired material is a fired body obtained by firing Ni oxide to which an Li-compound is added in a range from 1 to 15 mol% calculated in terms of Li_2O.

12. A fuel cell as set forth in claim 8, wherein the metal which is oxidation-resistant against the mixed fuel is silver.

13. A fuel cell as set forth in claim 8, wherein the metal or oxide thereof selected from a group of rhodium, platinum, ruthenium, palladium, and iridium, blended in the anode layer to be in a range from 1 to 50 vol% terms of metal.

14. A fuel cell as set forth in claim 8, wherein the anode layer containing, as an auxiliary component, one of samaria-doped ceria, scandia-stabilized zirconia, and yttria-stabilized zirconia at 50 vol% or less.

15. A fuel cell as set forth in claim 8, wherein the container defines therein first and second spaces, except for a region where the stack of fuel cell elements are, the feed and exhaust ports being communicated with the first and second spaces, respectively; and

the first and second spaces are filled with packing materials, so that a gap between the materials is a distance making it impossible to ignite the mixed fuel gas even if fuel gas has an oxygen concentration within an ignition limit.

16. A fuel cell as set forth in claim 15, wherein the packing materials are powdery particles, porous materials, or fine tubes, formed of a metal selected from a group of Ti, Cr, Te, Co, Ni, Cu, Al, Mo, Rh, Pd, Ag, W, Pt and Au or an alloy consisting two or more of them, or a ceramic containing one or more selected from a group consisting of Mg, Al, Si and Zr.

17. A fuel cell as set forth in claim 8, wherein the stack of fuel cell elements is accommodated in the container so that the cathode layer and the anode layer forming each fuel cell element are disposed parallel to a flowing direction of the mixed fuel gas.

18. A fuel cell as set forth in claim 8, wherein the a stack of fuel cell elements is accommodated in the container so that the cathode layer and the anode layer

forming each fuel cell element are disposed perpendicular to a flowing direction of the mixed fuel gas.

19. A fuel cell as set forth in claim 18, wherein the cathode layer, the anode layer and the solid electrolyte layer are made of porous material.

20. A fuel cell as set forth in claim 8 further comprising a heating means for heating the stack of fuel cell elements and cooling means for cooling the first and second spaces.